Historic, archived document

Do not assume content reflects current scientific knowledge, policies, or practices.

Cir # 22

CIRCULAR NO. 22.

United States Department of Agriculture,

DIVISION OF FORESTRY.

PRACTICAL ASSISTANCE TO TREE PLANTERS.

THE OFFER IN BRIEF.

The Division of Forestry is prepared, so far as its very limited appropriation will permit, to render practical and personal assistance to farmers and others by cooperating with them to establish forest plantations, woodlots, shelterbelts, and windbreaks. A section of the Division has recently been organized and placed in charge of an expert tree planter, assisted by a number of collaborators and assistants residing

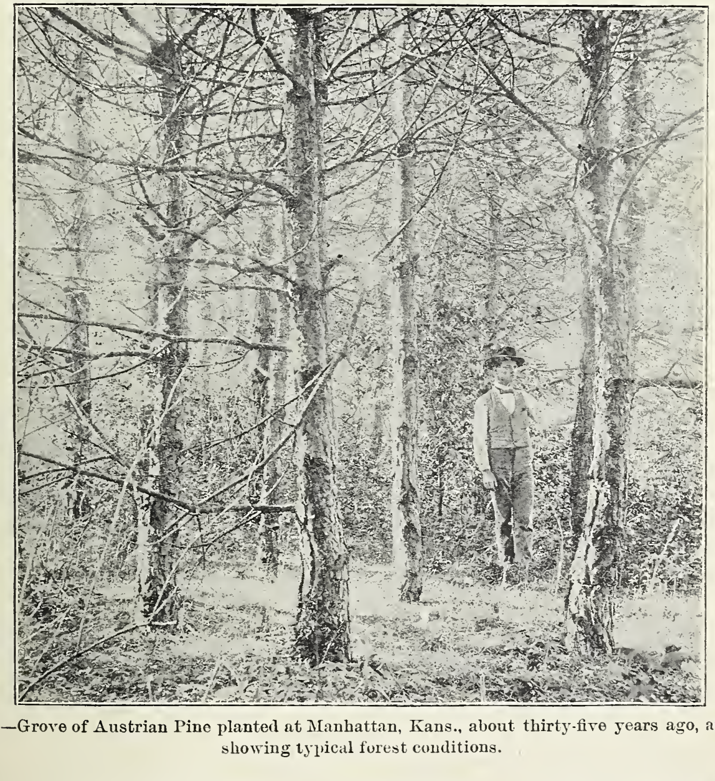

FIG. 1.—Grove of Austrian Pine planted at Manhattan, Kans., about thirty-five years ago, and now showing typical forest conditions.

in the different States, who are thoroughly familiar with their local conditions. This section will devote itself entirely to investigations in tree planting and to the assistance of those who may avail themselves of the cooperative plan outlined in this circular. Applications for such assistance will be considered in the order of their receipt, but the Division reserves the right to give preference to those likely to furnish the most useful object lessons. After an application has been made and accepted, the Superintendent of Tree Planting, or one of his collaborators or assistants, will visit the land of the applicant, and, after adequate study on the ground, will make a working plan suited to its particular conditions. The purpose of this plan is to give help in the selection of trees, information in regard to planting, and instruction in handling forest trees after they are planted.

Briefly stated, the division proposes to give such aid to tree planters that woodlots, shelterbelts, windbreaks, and all other economic plantations of forest trees may be so well established and cared for as to attain the greatest usefulness and most permanent value to their owners.

ORIGIN OF THE PLAN.

The cooperative plan announced in Circular No. 21 of this Division, by which farmers, lumbermen, and others are assisted in handling forest lands, has been so well received, that the Division offers, in the present circular, a similar cooperative plan to aid farmers and other land-owners in the treeless regions of the West, and wherever it is desirable to establish forest plantations. Under the provisions of Circular No. 21, issued in October, 1898, about 400,000 acres of woodland have already received attention. Applications have been received for assistance in the management of about 1,500,000 acres, and attention is being given to them as rapidly as the resources of the Division will permit.

Public recognition of the success of better methods applied to the management of timber lands is rapidly increasing. Equal success must follow the application of such methods to the developing of forest plantations, woodlots, and even shelterbelts and windbreaks. Upon that fact the cooperative plan set forth in this circular is based.

TREE PLANTING IN THE PAST.

Forest-tree planting has been in progress in the West for many years. Although reasonable success has usually followed skillful planting and close attention to the selection of species and to their subsequent care, many of the tree claims of that region are failures. This condition has largely arisen from the difficulty of obtaining accurate information at first hand regarding the most desirable species to grow in a given locality and from the lack of personal supervision by a competent tree planter in the setting out and subsequent care of the plantation. The growing of forest trees for economic purposes can not be successfully undertaken without some knowledge of trees, their habits, and their adaptability to the place where they are to be planted. The grower must know what to plant, how to plant it, and how to care for it afterwards.

Many of the earlier papers on forest-tree planting, scattered through the Western press and through the reports of Western horticultural societies, forest associations, and boards of agriculture, were based upon untried theories or upon experience too brief to warrant the deductions made. Many species were recommended with the utmost confidence for planting in regions for which later experience has shown them to be entirely unfit. Although many valuable papers occur in the great mass of published material on Western tree planting, they are so obscured by unreliable matter as to be of little use to the inexperienced planter.

WHAT IT TEACHES.

A careful study of the older tree claims of the West, of recent plantings, and of plantations set out and cared for under expert supervision, shows most forcibly the value of careful selection of species and of judgment in planting. Some of these plantations are dead or dying, others are in a thrifty condition; some are upon one kind of soil, some upon another; some are planted with trees close together, others with trees long distances apart; some have been pastured, others have not; some have been carefully cultivated, others have been allowed to grow to grass and weeds. Accurate conclusions drawn from the work of the past, a knowledge of the causes of failures, and a correct accounting for the successful plantings should materially lessen future failures. The application of such knowledge must necessarily give a new impulse to tree planting for economic purposes.

THE VALUE OF FORESTS TO FARMERS.

Few persons comprehend in full measure the direct and indirect value of forests to farmers. In the humid portions of America, where nearly every farm has its woodlot, the total area of the woodland is more than two hundred million acres. It is not possible to make an accurate statement of the value of the annual products from these lands, but when it is considered that nearly all the fuel used by the farmers of the region mentioned, together with most of the wood for fencing and a considerable portion of the timber for building purposes, are annually cut from the woodlots, their value begins to be appreciated.

For fuel and fencing the woodlot and other forest plantings are equally desirable to dwellers on the plains. On Mr. E. T. Hartley's farm, near Lincoln, Nebr., an acre of land set to Willow has for several years provided all necessary fuel used on the farm, and to-day there is more standing timber upon it than ever before. The planting is in a ravine of little value for general farming. A plantation of hardy Catalpa, near Hutchinson, Kans., planted in the spring of 1892, began a year ago to reimburse the owner. The trees taken out at that time, in thinning the plantation, were cut into fence posts. They were cut at the level of the ground and each tree furnished two posts. The trees removed averaged 18 feet high, one of the tallest measuring 21 feet 9 inches.

Forest plantations are valuable not only for the purposes above indicated, but in addition they have great indirect value. By conserving the moisture and tempering the wind, they modify the local climate to a very marked degree.

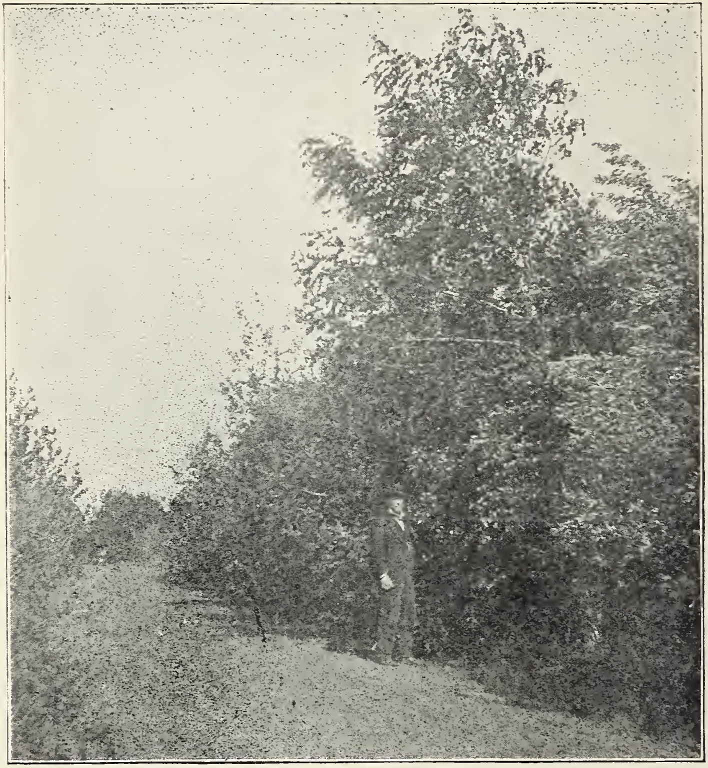

FIG. 2.—A mixed plantation, twelve years old, of Birch, Black Cherry, Green Ash, and White Elm at the Experiment Station, Brookings, S. Dak.

As the farmers of the plains come to recognize more fully the great indirect as well as direct value of forest plantations, woodlots, shelterbelts, and windbreaks, scattered over the agricultural treeless regions, and undertake to grow them in greater numbers, even if individual plantations are small in extent, the total result will be of vast importance in the development of the West.

SUCCESSFUL FOREST PLANTATIONS.

Tree culture in regions formerly treeless is dependent largely upon agriculture. Wherever large areas of land have been brought under cultivation the growing of trees is yearly becoming more successful. Nearly every State of the plains region has, among many failures, some admirable examples of plantations, of all ages from one to twenty-five or more years, which have been in every way successful. The success of these plantations, when compared with the more numerous failures, proves the great need for practical experience, combined with wide and accurate knowledge, in growing forest trees in the West.

The forest plantation at the Agricultural College, Brookings, S. Dak., illustrates what may be accomplished in a few years on the open prairies of that State. The plantation at the Agricultural College, Manhattan, Kans., with its dense undergrowth, illustrates the possibility of the perpetuation of forests in that and similar localities after they are once well established, and many of the Catalpa plantations of Kansas and southern Nebraska are living arguments in favor of tree planting on the plains. At Ogallah, longitude nearly 100 west, the State of Kansas has established a forest experiment station. The vigorous growth of many of the species at this station illustrates the value

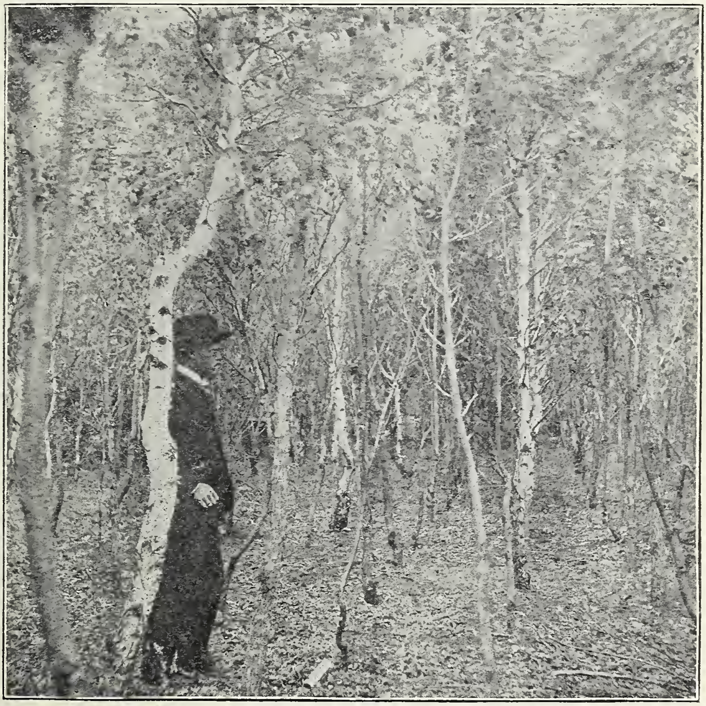

FIG. 3.—Interior view of plantation illustrated in fig. 2.

of thorough cultivation as a means of overcoming the effects of continued drought. The neighboring tree claims are either dead or in poor condition, largely from lack of cultivation. On the farm of Judge C. E. Whiting, Monona County, Iowa, the timberbelts, planted about forty years ago, supply all the posts for keeping up 40 miles of fencing, the fuel for the homestead and the tenants, and a large surplus as well. Only the overtopped trees are cut. Each species is planted pure, the trees growing in belts and in groves which protect the fields and the farm buildings. A varied undergrowth is coming in, which will maintain the forest after all the planted trees are cut down. The plantations established a few years ago by this Division in cooperation with the agricultural experiment stations in many of the Western States show interesting possibilities in mixed planting and in the selection of species.

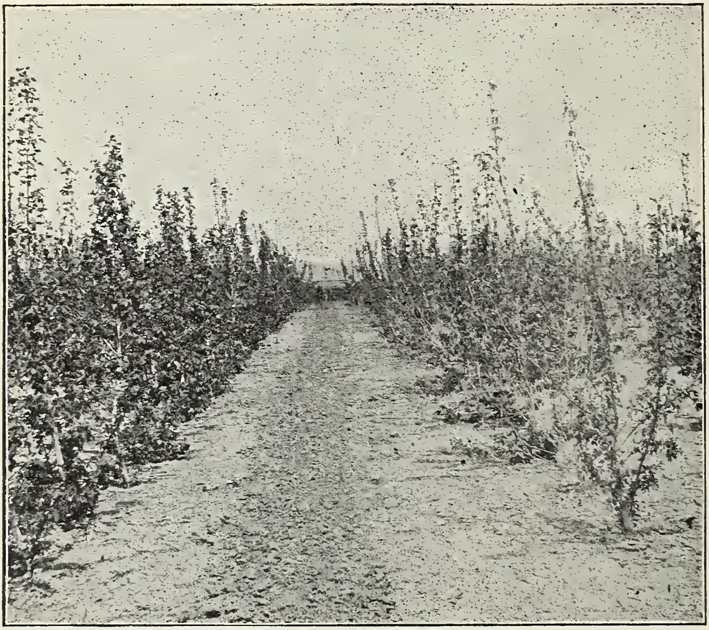

Fig. 4.—Typical view of young forest plantation two years after planting. The plat on the left is a mixed planting of Boxelder, Oak, White Elm, Green Ash, and Black Locust. The plat on the right is set to Russian Mulberry, Oak, White Elm, Black Locust, Honey Locust, Green Ash, and Boxelder. This plantation is at Logan, Utah.

Many similar illustrations are available to show what has been done and to indicate the possibilities in tree planting in the West.

WHY FARMERS SHOULD PLANT.

It is not reasonable to suppose that forest-tree culture can be made a direct source of great financial profit in the arid regions. But if it can not bring in important sums it can save the farmer very considerable expenditures by supplying material which he would otherwise have to buy. The indirect value, too, of well-established groves, woodlots, shelterbelts, and windbreaks, in the protection which they afford, is of the first importance. Such plantations, in addition to being of direct use for fuel, fence posts, and material for many miscellaneous farm uses, are invaluable in providing protection for crops, orchards, stock, and farm buildings.

One of the most important indirect services of forest plantations, and one rarely taken into consideration, is the increased market value of a well-wooded farm on the prairie lands of the West over one without timber. Conservative estimates made on the ground indicate that the farms of eastern and central Kansas and Nebraska that have well-developed plantations of forest trees upon them, either in the form of woodlots, shelterbelts, or windbreaks, are worth more per acre than farms without them.

AN INCIDENTAL VALUE OF FOREST PLANTATIONS.

To the majority of people there is nothing else so attractive about a home as trees. A well-planted woodlot, in two or three years after its establishment, will provide the farmer with a supply of trees to plant along roads and for ornamental purposes about buildings and gardens. As the trees in a plantation begin to crowd each other many may be removed with material advantage to those that remain, care being taken not to interfere with the shading of the ground. The superfluous trees often pay the cost of cultivation and care for the plantation after it is once established.

COST OF PLANTING AND CULTIVATING FOREST TREES.

The cost of planting and the subsequent care of a forest plantation varies greatly. Much depends upon the kinds of trees planted, the cost of labor, and the character of the soil. In most places in the West trees can now be bought very cheaply. Deciduous trees of one season's growth, which under most conditions is the best age for general planting, can be purchased in quantity at prices varying from 65 cents to $5 per thousand. But even at this price in the case of the hardier trees, such as Green Ash, Soft Maple, White Elm, Boxelder, Cottonwood, Aspen, and Locust, it is much more convenient and usually cheaper for the farmer to grow his own seedlings.

Conifers are more difficult to grow from the seed, and most farmers will find it better to buy trees of this class from nurserymen. If, however, conifers are purchased directly from the seed-bed, the more common species will cost from $2.50 to $5 per thousand. Such plants must be grown for two or three years in beds or nursery rows before transferring to the plantation.

The stock for a mixed plantation of desirable species, one year old, set 4 feet apart each way, should be obtained at the cost of from $4 to $9 per acre. For older stock and for species difficult to grow from seed or rare in nurseries the cost will be much greater.

After the first year the cost will depend very greatly upon the success of the first planting. Thorough cultivation will be required until the trees are sufficiently large to shade out grass and weeds. In treeless regions the same care that a successful farmer gives his cornfield should be given forest plantations for the first two or three years. Not only should weeds and grass be kept down, but the surface soil should be frequently broken during the driest portion of the year to prevent excessive soil evaporation and consequent injury to the trees.

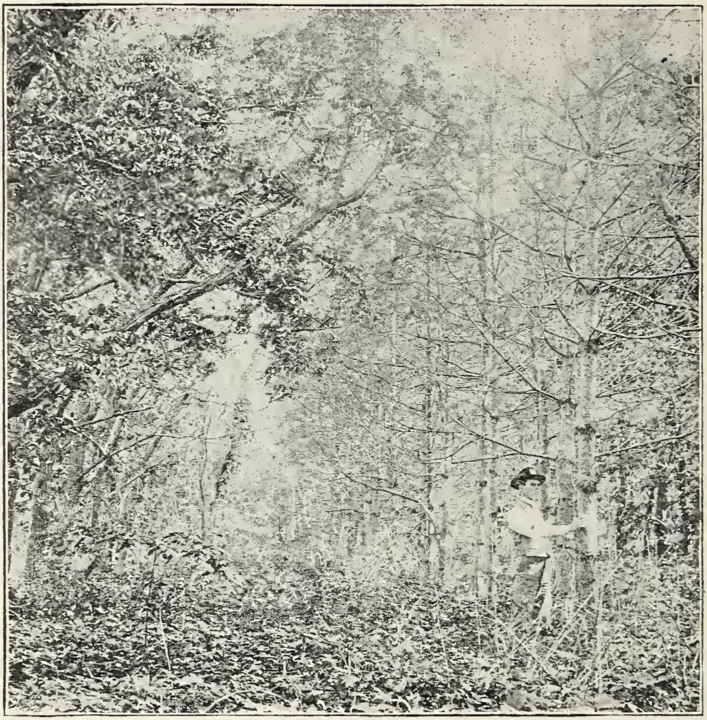

FIG. 5.—Belt of Scotch Pine and Black Walnut planted at Manhattan, Kans., about thirty-five years ago and now with a dense undergrowth of woody plants.

WHEN AND HOW LONG PLANTATIONS PAY.

The immediate value of the woodlot for fuel will depend largely upon the rapidity of growth of the trees planted and the fuel value of their products. Under favorable circumstances, after the woodlot has reached the age of from eight to twelve years, some trees suitable for fuel and posts can be taken out yearly without injury to the rest. If the plantation be correctly managed, young trees will often come up of their own accord to take the places of the older trees as they are removed. This is true already in many of the better managed among the older plantations in the West. Under a broad shelterbelt of Pine, Soft Maple, White Elm, Black Walnut, and Ash, planted some thirty-five years ago at Manhattan, Kans., there is now a thick undergrowth which contains a large percentage of the trees and shrubs indigenous to eastern Kansas. This undergrowth is entirely the result of natural conditions. Seeds from trees and shrubs on the river bottoms have been brought in by the wind and by birds and other forms of animal life. Undergrowth of this kind, which varies in this plantation from a few inches to 15 feet in height, will, if properly managed, provide ample material to take the place of the older trees as they are gradually cut down. In this plantation, as in others handled in like manner, there is no reason why there should not be a continual succession of trees, generation after generation, without the expenditure of a single dollar for replanting. But if sheep or other stock are allowed to graze in or overrun a plantation, undergrowth is prevented from coming in, and no provision is made for the perpetuation of the forest condition. The soil becomes packed by the trampling of the stock, the natural mulch is destroyed, and the trees suffer.

After a wood lot has begun to provide fuel, posts, and other material for farm uses it should continue to supply such products indefinitely. To secure this result, however, only a limited amount may be taken out in any single season.

The many failures on the timber claims of the West should not be discouraging. Much of the poor success has been directly due to the selection of undesirable species, poor judgment in planting, and to the lack of proper care of the plantation after its establishment.

PLANTING IN NONIRRIGATED REGIONS.

In nearly the whole of the broad prairie belt extending from the wooded regions to longitude 100° west, and reaching from North Dakota to Texas, trees may be grown with varying success. On the western border of the wooded area nearly all the species may be grown which are indigenous to the adjacent woodlands. Farther west the range in selection becomes more and more restricted, until the western limit of successful tree culture on nonirrigated lands is reached.

PLANTING ON WORN-OUT FARMS.

Many of the worn-out farms in humid regions may be brought back to their original fertility by growing forest trees upon them for a series of years, and very many of them contain land better suited to the production of wood than to any other purpose. Such land should never have been cleared. It is fortunately true that throughout the regions once wooded worn-out farm lands will usually revert to their previous condition if protected from fire and stock. This result may be very materially hastened and usually more desirable species grown if some attention be given to forest planting.

PLANTING IN IRRIGATED REGIONS.

As a rule, but little difficulty is experienced in growing trees in irrigated regions. Proper judgment in the selection of species is, however, of great importance. From the standpoint of money return, forest plantations and woodlots can not be successfully established on irrigated lands on account of the high value of such land for other purposes. Many irrigated farms, however, have waste places along ditches and elsewhere where forest trees may be grown to advantage for economic purposes, and windbreaks are always useful and often among the prime necessities for irrigation farming. Shelterbelts may sometimes be planted on grade lines along rocky ridges or stony elevations with little expense for irrigation and with material advantage to the farm.

In many irrigated regions some trees will thrive fairly well without irrigation after the first or second season's growth.

THE PLAN OF COOPERATION.

Applications for assistance under the terms of this circular will be considered, as already stated, in the order in which they are received, but precedence will be given to the lands most likely to furnish useful examples, after the study on the ground has been made. The plan formulated for establishing and developing the forest plantation, woodlot, shelterbelt, or windbreak will not be put into effect unless it be satisfactory both to the Division of Forestry and to the owner. The specific agreement which the Department of Agriculture is prepared to make is as follows:

TREE-PLANTING AGREEMENT.

WASHINGTON, D. C., ———, *189—*.

The Department of Agriculture of the United States and ——— ———, of ———, county of ———, State of ———, mutually agree as follows:

(1) The Department of Agriculture, in pursuance of investigations in forestry and in order to disseminate a knowledge of improved ways of planting and developing forest plantations, woodlots, shelterbelts, and windbreaks, shall, after personal study on the ground by its agent or agents, prepare a plan for planting and caring for a forest plantation, woodlot, shelterbelt, or windbreak, on —— acres of land of the said ——— ———, situated in the town of ———, county of ———, State of ———.

(2) The said plan shall be prepared for the purpose of promoting and increasing the present value and usefulness of said land to its owner and to develop and perpetuate a plantation of forest trees upon it.

(3) Upon the completion of the said plan and its acceptance by the said ——— ———, the Department of Agriculture shall supervise the execution thereof so far as may be necessary.

(4) If the area described in paragraph 1 does not exceed 5 acres in extent, the Department of Agriculture shall render all services under this agreement wholly without charge to the said ——— ———, but it shall not participate in any case or in any degree in the expenses of planting and caring for the said forest plantation, woodlot, shelterbelt, or windbreak, except to defray the pay and expenses of its agent or agents, or in any profits or returns which may arise from its growth.

(5) If the area described in paragraph 1 is larger than 5 acres, the cost of executing the provisions of this agreement shall be paid as follows:

(*a*) A preliminary visit of inspection, if required, shall be wholly at the charge of the Department.

(*b*) Actual and necessary expenses for traveling and subsistence of the agent or agents of the Department working under this agreement, except as provided in the foregoing paragraph (*a*), shall be paid by the said ——— ———. In the present case these expenses are estimated at $——. What are "actual and necessary expenses" shall be determined by the printed regulations of the Department.

(6) The Department of Agriculture shall have the right to publish and distribute the said plan and its results for the information of farmers and others whom it may concern.

(7) This agreement may be dissolved by either party upon ten days' notice given to the other.

(Signed) ——— ———,
Owner.

(Signed) ——— ———,
Secretary of Agriculture.

The working plan above mentioned, being completed, is now accepted, and will be carried out under the conditions and during the validity of the above agreement.

(Signed) ——— ———,
Owner.

HINTS TO APPLICANTS.

Persons desiring the assistance of the Division as here indicated should make application as early as November of each year, or earlier if possible, so that ample time may be afforded the agent of the Division to visit the farm of the applicant and formulate plans under which the work is to proceed in time for the planter to order the nursery stock or seeds for spring planting. Applications which do not reach the office by November 15 are likely to go over until the following year.

Applicants are requested to specify the acreage, situation, and soil conditions of the land which they desire to plant. The land should be located by State, county, and township, or by public surveys.

GIFFORD PINCHOT,
Forester.

Approved:
JAMES WILSON,
Secretary of Agriculture.
WASHINGTON, D. C., *July 8, 1899.*